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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/766,207	01/29/2004	Walter Schwarzenbach	4717-11600	3337

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EXAMINER	
DUONG, KHANH B	

ART UNIT	PAPER NUMBER
2822	

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06/29/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/766,207	SCHWARZENBACH ET AL.	
	Examiner	Art Unit	
	Khanh B. Duong	2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 May 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,4 and 8-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,4 and 8-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 21, 2007 has been entered.

Response to Amendment

Accordingly, claims 1, 4 and 8-22 were amended. Claims 2, 3, 5-7 were previously canceled.

Currently, claims 1, 3, 4 and 8-22 remain pending.

Response to Arguments

Applicant's arguments with respect to the amended claims have been considered and addressed in view of the following ground(s) of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 4, 8-12 and 14-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi et al. (U.S. Patent No. 6,597,039) in view of Henley et al. (US 6,162,705).

Ohmi et al. ("Ohmi"), previously cited, discloses in 6A-6C a method of detaching a layer 37 from a wafer 1, which comprises: creating an weakened zone ("separation area") 3 in a wafer 1 to define the layer 37 to be detached and a remainder portion 38 of the wafer 1, such that the weakened zone 3 includes a main region 31 and a localized super-weakened region 32 that is more weakened than the main region 31; and initiating detachment of the layer 37 from the remainder portion 38 at the super-weakened region 32 by applying a controlled detachment force (heating or external force) to at least the weakened zone 3 such that the detachment initiates and propagates from the super-weakened region 32 through the main region 31 to detach the layer 37 from the remainder portion 38 [see col. 10, lines 18-38]; and wherein the detachment force 111 is applied to both the super-weakened region 32 and the main region 31.

Re claim 1, Ohmi does <u>not</u> specifically disclose applying the heat substantially evenly over substantially the entire weakened zone to initiate and propagate detachment.

Henley et al. ("Henley") teaches a thermal source (e.g. furnace, gas jet, etc.) can be used to apply (e.g. flow) heat substantially evenly over the entire substrate 2300 (including weakened zone 2111) for the purpose of increasing the energy or stress of the substrate material toward an energy level necessary to initiate the cleaving action prior to providing additional energy (2301 & 2303) to initiate and propagate a controlled cleaving (detaching) action [see col. 9, line 21 to col. 14, line 14]. Thus, it is respectfully submitted that Henley does use uniform heating of the entire substrate 2300 to initiate the cleaving action.

Since Ohmi and Henley are from the same field of endeavor, the purpose disclosed by Henley would have been recognized in the pertinent prior art of Ohmi.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the controlled-cleaving process of Henley into the delamination process of Ohmi, since Henley states at column 10, lines 10-18 that such modification would provide a thin film of silicon material having limited surface roughness and desired planarity characteristics for use in a silicon-on-insulator substrate as compared to those of pre-existing techniques.

Re claim 4, Ohmi expressly discloses in FIG. 6A the detachment force is obtained by applying energy to the weakened zone 3.

Re claim 8, Ohmi discloses the heating of the weakened zone comprises thermally annealing the wafer [see col. 10, lines 21-23].

Re claim 9, see discussions above regarding claim 1.

Re claim 10, see discussions above regarding claim 1.

Re claim 11, Ohmi discloses in FIG. 1C the weakened zone 3 is created by implanting a dose of atomic species in the wafer [see col. 10, lines 4-11].

Re claim 12, Ohmi discloses the super-weakened region 32 is created by implanting an overdose of the atomic species compared to the dose of atomic species implanted in the main region 31 [see col. 10, lines 13-17].

Re claim 14, Ohmi discloses an initial dose of atomic species is applied to the weakened zone, and the overdose is applied to the super-weakened region after the application of the initial dose [see col. 10, lines 4-11].

Re claim 15, Ohmi discloses the weakened zone 3 is created by producing a porous layer in the wafer 1 [see col. 6, lines 24-35].

Re claim 16, Ohmi expressly discloses in FIGs. 1A-1C the weakened zone 3 extends through a crystalline layer of the wafer 1.

Re claim 17, Ohmi discloses the wafer 1 comprises a semiconductor material [see col. 6, lines 37-39].

Re claim 18, as previously discussed above, the combined teaching of Ohmi and Henley discloses providing a uniform temperature distribution to heat the weakened zone, it is inherent that the detached layer is substantially homogenous and comprises a "low" surface roughness and "improved" homogeneity.

Re claim 19, see discussions above regarding claims 1 and 18.

Re claims 20-22, Ohmi expressly shows in FIG. 6A the localized super-weakened region 32 covers an "angular sector" of 360 degrees at the periphery of the weakened zone.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi and Henley as applied to claims 1, 4, 8-12 and 14-22 above, and further in view of Aspar et al. (U.S. 2003/0234075 A1).

Re claim 13, Ohmi and Henley fail to disclose the atomic species is applied in substantially a single operation to both the super-weakened and main regions.

Aspar et al. ("Aspar"), previously cited, suggests in FIG. 1C the atomic species is applied in substantially a single operation to both the super-weakened region 36 and main region 12. [see page 3, paragraph [0054]].

Since Ohmi, Henley and Aspar are from the same field of endeavor, the purpose disclosed by Aspar would have been recognized in the pertinent prior art of Ohmi and Henley.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combined method disclosed by Ohmi and Henley as suggested by Aspar because of the desirability to minimize process steps.

Response to Arguments

Applicant's arguments filed May 21, 2007 have been fully considered but they are not persuasive.

Applicant persistently argues that Ohmi and Henley do not disclose applying a controlled detachment force obtained by heating at least the weakened zone where the heat is applied substantially evenly over substantially the entire weakened zone.

In response, the Examiner respectfully disagrees because Ohmi does disclose in FIG. 6A separating a composite member (layers 1-4) by applying a thermal treatment (heating) to the composite member, wherein in the separation area (weakened zone) 3, the peripheral (twice-

implanted/super-weakened region) region 32 is the first to crack (cleave) [see col. 10, lines 3-28]. Thus, it follows that, during the same thermal treatment, the main (once-implanted) region 31 is the second to crack resulting with the total separation of the composite member [see FIG. 6B]. From such teaching, it can be concluded that the thermal treatment was applied substantially evenly over substantially the entire composite member (including the entire weakened zone 3) in order for the entire composite member to be separated. However, the Ohmi reference does not specifically and directly state such technique. On the other hand, Henley was cited to specifically show the use of an energy source (e.g., heat source) to increase a global energy level of a composite member to a level necessary for a subsequent initiation of a cleave front in the implanted (weakened zone) region 1009 [see Figs. 10 and 11; col. 9, lines 41-55]. In another embodiment, Henley discusses an un-desired method of heating the entire substrate temperature to initiate and sustain the cleaving action [see col. 10, lines 21-24]. Thus, Henley has suggested the use of uniform heating of the entire substrate including the entire implanted region (weakened zone) to initiate the cleaving action.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh B. Duong whose telephone number is (571) 272-1836. The examiner can normally be reached on Monday-Friday from 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on (571) 272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KBD

Zandra V. Smith
Supervisory Patent Examiner
25 June 2007